Fennel

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Scientific Name and Introduction: Fennel (*Foeniculum vulgaris* Mill) belongs to the Umbelliferae family and originated in the Mediterranean region. There are two varieties; seed fennel is var. *sativum* and edible fennel is var. *dulce*. The edible parts are the white, enlarged basal parts of the leaf sheathes that are fleshy, turgid, and crispy. The leafy sheathes form a "grumolo" that is white, ball shaped, and the source of green stems and fuzzy leaves. Italian production accounts for 85% of the world market. Fennel is a source of fiber, potassium and Vitamin C.

Quality Characteristics and Criteria: There are no published quality standards, but extra fancy fennel is characterized by uniform and brilliant white leafy sheathes that must be turgid and crispy, with no symptoms of cracking or darkening.

Horticultural Maturity Indices: Fennel is harvested by hand when the plant reaches a specified size, by cutting the plant from the taproot and trimming the leaves so only 10 to 15 cm (4 to 6 in) long green stems are left. It is harvested year-round, except in June and July.

Grades, Sizes and Packaging: Fennel is sized by the packer and placed in plastic or cardboard boxes. Careful packing is necessary to avoid scratching sheathes which then rapidly turn brown.

Pre-cooling conditions: Hydro-cooling is mandatory in the Summer to reduce water loss and remove field heat. Chlorinated water and citrate are used to control browning of cut surfaces. Avoid excess water during packing. Forced-air cooling can be used, but only for plastic wrapped fennel. Vacuum-cooling has been tested (Sozzi and Ilardi, 1992).

Optimum Storage Conditions: Fennel stored at 0 °C (32 °F) with 90 to 95% RH can last for 2 weeks.

Controlled Atmosphere (CA) Considerations: No CA application has been reported.

Retail Outlet Display Considerations: Fennel must be kept refrigerated and periodically moistened with water sprays. Removal of injured sheathes and brown cut surfaces may be needed.

Chilling Sensitivity: Fennel is not chilling sensitive.

Ethylene Production and Sensitivity: Ethylene production is low at 0 to 2 °C (32 to 35.6 °F), about 0.5 to 1.0 μL kg^{-1} h^{-1}, and increases to 2.5 to 6 μL kg^{-1} h^{-1} at 20 °C (68 °F) (Mencarelli et al., 1996). No data exist on sensitivity to ethylene.

Respiration Rates:

Temperature	mg CO_2 kg^{-1} h^{-1}
2 °C	18 to 20
20 °C	24 to 40

To get mL kg^{-1} h^{-1}, divide the mg kg^{-1} h^{-1} rate by 2.0 at 0 °C (32 °F), 1.9 at 10 °C (50 °F), and 1.8 at 20 °C (68 °F). To calculate heat production, multiply mg kg^{-1} h^{-1} by 220 to get BTU per ton per day or by 61 to

get kcal per metric ton per day.

Physiological Disorders: Growth after harvest can cause the leaf sheathes to loosen and separate (Mencarelli et al., 1996). Freezing results in water soaked spots on the outside sheathes and decay of internal young sheathes.

Postharvest Pathology: Fennel is resistant to pathogens attach after harvest. Free water inside the plant can promote bacterial growth.

Quarantine Issues: None.

Suitability as Fresh-cut Product: Browning of cut surfaces is a problem with fresh-cut fennel.

Special Considerations: Special attention must given to the mechanical harvesting and to postharvest handling because fennel is highly sensitive to physical injury. Removal of outer sheathes at retail markets reduces the problem, but it is time consuming.

References:

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